

Appl. No. 09/720,761  
Att. Docket No. 10191/1629  
Reply To Office Action of 12/1/03

**Amendments to the CLAIMS:**

Without prejudice, this listing of the claims replaces all prior versions and listings of the claims in the present application:

**LISTING OF CLAIMS:**

1-18. (Canceled).

19. (Currently Amended) A method of anisotropic plasma etching a laterally defined structure in a silicon substrate using a process gas, the method comprising the steps of:

precipitating at least one passivating material at least on a side wall of the laterally defined structure at least one of prior to the anisotropic plasma etching and during the anisotropic plasma etching; ~~[[and]]~~

adding a fluorine-delivering etching gas at least from time to time to the process gas, the fluorine-delivering etching gas including at least a compound selected from the group consisting of  $\text{ClF}_3$ ,  $\text{BrF}_3$  and  $\text{IF}_5$ ; and

adding at least one gas selected from the group consisting of  $\text{C}_4\text{F}_8$  and  $\text{C}_3\text{F}_6$  to the process gas as a gas forming the at least one passivating material.

20. (Canceled).

21. (Currently Amended) The method of claim 19, further comprising the step of adding at least one gas selected from the group consisting of  $\text{O}_2$ ,  $\text{N}_2\text{O}$ ,  $\text{NO}$ ,  $\text{NO}_x$ ,  $\text{CO}_2$ , ~~[[Ar,]]~~ and  $\text{NO}_2$  and  $\text{N}_2$  to the process gas.

22. (Previously Presented) The method of claim 19, further comprising the step of adding at least one of an additive, a fluoroalkane and  $\text{NF}_3$  for consuming the at least one passivating material to the process gas, the at least one passivating material including one of  $\text{SiO}_2$  and a fluoropolymer material, and the at least one additive including at least one of  $\text{CHF}_3$ ,  $\text{CF}_4$ ,  $\text{C}_2\text{F}_6$ ,  $\text{C}_3\text{F}_6$ ,  $\text{C}_4\text{F}_8$ ,  $\text{C}_4\text{F}_{10}$  and  $\text{C}_3\text{F}_8$ .

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23. (Previously Presented) The method of claim 19, further comprising the step of adding at least one of H<sub>2</sub>, He and Ne to the process gas.

24. (Currently Amended) A method of anisotropic plasma etching a laterally defined structure in a silicon substrate using a process gas, the method comprising the steps of:

precipitating at least one passivating material at least on a side wall of the laterally defined structure at least one of prior to the anisotropic plasma etching and during the anisotropic plasma etching; [[and]]

adding NF<sub>3</sub> to the process gas as an additive for consuming at least one of the at least one passivating material, SiO<sub>2</sub> and a fluoropolymer material;

adding a fluorine-delivering etching gas to the process gas, the fluorine-delivering etching gas including at least one compound selected from the group consisting of SF<sub>6</sub>, ClF<sub>3</sub>, BrF<sub>3</sub> and IF<sub>5</sub>; and

adding at least one gas selected from the group consisting of C<sub>4</sub>F<sub>8</sub> and C<sub>3</sub>F<sub>6</sub> to the process gas as a gas forming the at least one passivating material.

25. (Canceled).

26. (Canceled).

27. (Currently Amended) The method of claim 24, further comprising the step of adding at least one gas selected from the group consisting of O<sub>2</sub>, N<sub>2</sub>O, NO, NO<sub>x</sub>, CO<sub>2</sub>, [[Ar,]] and NO<sub>2</sub> and N<sub>2</sub> to the process gas.

28. (Previously Presented) The method of claim 24, further comprising the step of adding at least one of H<sub>2</sub>, He and Ne to the process gas.

29. (Currently Amended) A method of anisotropic plasma etching a laterally defined structure in a silicon substrate using a process gas, the method comprising the steps of:

precipitating a passivating material on at least one side wall of the laterally defined structure at least one of prior to the anisotropic plasma etching and during the anisotropic plasma etching; and

adding a light, easily ionizable gas to the process gas to at least one of improve selectivity, reduce charging effects, increase separation between light ions and heavy ions, and reduce or suppress stray trench fields

~~adding at least one of H<sub>2</sub>, He and Ne to the process gas.~~

30. (Previously Presented) The method of claim 29, further comprising the step of adding at least one fluorine-delivering etching gas to the process gas, the fluorine-delivering etching gas including at least one of a compound selected from the group consisting of SF<sub>6</sub>, ClF<sub>3</sub>, BrF<sub>3</sub> and IF<sub>5</sub>.

31. (Previously Presented) The method of claim 29, further comprising the step of adding at least one gas selected from the group consisting of SiF<sub>4</sub>, C<sub>4</sub>F<sub>8</sub>, C<sub>3</sub>F<sub>6</sub>, C<sub>4</sub>F<sub>10</sub>, C<sub>3</sub>F<sub>8</sub> and C<sub>2</sub>F<sub>6</sub> to the process gas as a gas forming the at least one passivating material.

32. (Currently Amended) The method of claim 29, further comprising the step of adding at least one gas selected from the group consisting of O<sub>2</sub>, N<sub>2</sub>O, NO, NO<sub>x</sub>, CO<sub>2</sub>, [[Ar,]] and NO<sub>2</sub> and N<sub>2</sub> to the process gas.

33. (Previously Presented) The method of claim 29, further comprising the step of adding at least one of an additive, a fluoroalkane and NF<sub>3</sub> to the process gas for consuming at least one of the at least one passivating material, SiO<sub>2</sub> and a fluoropolymer material, the additive including one of CHF<sub>3</sub>, CF<sub>4</sub>, C<sub>2</sub>F<sub>6</sub>, C<sub>3</sub>F<sub>6</sub>, C<sub>4</sub>F<sub>8</sub>, C<sub>4</sub>F<sub>10</sub> and C<sub>3</sub>F<sub>8</sub>.

34. (Currently Amended) A method of anisotropic plasma etching a laterally defined structure in a silicon substrate using a process gas, the method comprising the steps of:

precipitating at least one passivating material on at least a side wall of the laterally defined structure at least one of prior to the anisotropic plasma etching and during the anisotropic plasma etching;

adding at least one fluorine-delivering etching gas to the process gas, the at least one fluorine-delivering etching gas including at least one compound selected from the group consisting of  $\text{ClF}_3$ ,  $\text{BrF}_3$  and  $\text{IF}_5$ ;

adding  $\text{NF}_3$  to the process gas as an additive for consuming the at least one passivating material; and

adding a light, easily ionizable gas to the process gas to at least one of improve selectivity, reduce charging effects, increase separation between light ions and heavy ions, and reduce or suppress stray trench fields

~~adding at least one of  $\text{H}_2$ , He and Ne to the process gas.~~

35. (Previously Presented) The method of claim 34, further comprising the step of adding at least one gas selected from the group consisting of  $\text{SiF}_4$ ,  $\text{C}_4\text{F}_8$ ,  $\text{C}_3\text{F}_6$ ,  $\text{C}_4\text{F}_{10}$ ,  $\text{C}_3\text{F}_8$  and  $\text{C}_2\text{F}_6$  to the process gas as the gas forming the at least one passivating material.

36. (Currently Amended) The method of claim 34, further comprising the step of adding at least one gas selected from the group consisting of  $\text{O}_2$ ,  $\text{N}_2\text{O}$ ,  $\text{NO}$ ,  $\text{NO}_x$ ,  $\text{CO}_2$ ,  $[[\text{Ar}]]$  and  $\text{NO}_2$  and  $\text{N}_2$  to the process gas.

37. (New) A method of anisotropic plasma etching a laterally defined structure in a silicon substrate using a process gas, the method comprising the steps of:

precipitating at least one passivating material at least on a side wall of the laterally defined structure at least one of prior to the anisotropic plasma etching and during the anisotropic plasma etching;

adding a fluorine-delivering etching gas at least from time to time to the process gas, the fluorine-delivering etching gas including at least a compound selected from the group consisting of  $\text{ClF}_3$ ,  $\text{BrF}_3$  and  $\text{IF}_5$ ;

adding at least  $\text{SiF}_4$  to the process gas as a gas forming the at least one passivating material; and

adding at least one gas selected from the group consisting of  $\text{O}_2$ ,  $\text{N}_2\text{O}$ ,  $\text{NO}$ ,  $\text{NO}_x$ ,  $\text{CO}_2$ , and  $\text{NO}_2$  to the process gas.

38. (New) A method of anisotropic plasma etching a laterally defined structure in a silicon substrate using a process gas, the method comprising the steps of:

precipitating at least one passivating material at least on a side wall of the laterally defined structure at least one of prior to the anisotropic plasma etching and during the anisotropic plasma etching;

adding  $\text{NF}_3$  to the process gas as an additive for consuming at least one of the at least one passivating material,  $\text{SiO}_2$  and a fluoropolymer material;

adding a fluorine-delivering etching gas to the process gas, the fluorine-delivering etching gas including at least one compound selected from the group consisting of  $\text{SF}_6$ ,  $\text{ClF}_3$ ,  $\text{BrF}_3$  and  $\text{IF}_5$ ;

adding at least  $\text{SiF}_4$  to the process gas as a gas forming the at least one passivating material; and

adding at least one gas selected from the group consisting of  $\text{O}_2$ ,  $\text{N}_2\text{O}$ ,  $\text{NO}$ ,  $\text{NO}_x$ ,  $\text{CO}_2$ , and  $\text{NO}_2$  to the process gas.

39. (New) The method of claim 29, wherein the light, easily ionizable gas includes at least one of  $\text{H}_2$ , He and Ne.

40. (New) The method of claim 34, wherein the light, easily ionizable gas includes at least one of  $\text{H}_2$ , He and Ne.